ASHESI UNIVERSITY COLLEGE

An Inventory Management Optimization Strategy for LittyMart Enterprise

By

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DECLARATION

I hereby declare that this Applied Project Report is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

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Date: 18th April, 2018

I hereby declare that the preparation and presentation of the Applied Project Report were supervised in accordance with the guidelines on supervision of Applied Projects laid down by Ashesi University College.

Supervisor's Signature: _____

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Date: 18th April 2018

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EXECUTIVE SUMMARY

This research initially analyzed the current state of the inventory management practices at LittyMart. LittyMart is limited liability Company that deals in items such as kitchen napkins and underwear for both sexes. This project aims to help optimize the firm's inventory by creating a simple and efficient tool. Amid the strength of the firm are a good marketing strategy, diverse product list, and good relationship with trading partners. The Weakness of the firm includes the occurrence of holding excesses inventory and stock-outs. The firm also has the opportunity to diversify into other products and also open stores in different market locations. Threats of competition, changes in consumer behavior and supplier manufacturing terms are imminent. The firms operate in the Fast Moving Consumer Goods (FMCG) of Ghana's informal sector, more specifically, Mokola, which is the number one goods trading hub in the country.

The needs analysis used interviews and observations as the methods of data collection and the findings show that LittyMart has captured a considerable market share due to its long years of operation. The results also indicate shortfalls in managing inventory. The survey purposively selected workers of LittyMart for the study, as well as customers and some competitors. Workers were interviewed and surveyed to help the researcher understand the current inventory practices of LittyMart. In addition to that, direct and indirect Competitors, as well as customers, were interviewed to understand the macro environment of the firm. The literature reviewed focused on inventory optimization strategies relevant to Small and medium enterprises (SME's). The tool was built featuring the ABC and EOQ models. The final tool was then developed using Microsoft Excel, which is stored on Google drive. Google drive permits individuals to

log in to make changes. The tool, when implemented, will reduce overstocking and inventory cost thereby increasing profitability.

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Chapter 1: INTRODUCTION

1.1 Chapter Overview

The goal of every business is to maximize value for its shareholders. To ensure this, managers see to it that all areas within the organization operate efficiently. One key component of a goods oriented business is inventory, which is a sum of raw materials, works in progress and finished goods. It also includes maintenance, repairs and operating materials. Inventory in such organizations constitutes a bulk of the firm's assets thus, must be managed carefully. The inventory management style chosen depends on the size of the organization and the type of products or services it offers among others. Managing inventory means creating a balance between having enough stock to meet customer needs and not running out of stock which results in lost sales. Additionally, it is the balance required to manage stock efficiently satisfying the requirements of customers as well as minimizing operational costs of the business, thereby increasing profit. Inventory management is a control measure that is used to establish how much stock an enterprise has in its holdings and how the firm keeps track of it (Chase *et al.,* 2004). It provides solutions to questions such as when and how much to order. LittyMart Company Limited is a Ghanaian based company looking to optimize its inventory by using tacking and control measures to help reduce the occurrence of holding excess inventory and stock-outs. Moreover, the firm hopes to employ clearance strategies of excess inventory they currently carry. This chapter details the profile of the company, SWOT analysis and the macro and microenvironment it operates in.

1.2 COMPANY PROFILE OF LITTYMART

LittyMart Company Limited is a limited liability establishment in the real estate and goods trading industry in Ghana, which has been operating for over thirty years. LittyMart, being the parent company, comprises two sub-companies that specialize in real estate development and trading of wholesale goods such as underwear, napkins, and handkerchief among others.

LetiVille is a family owned Ghanaian real estate Company established in September 2005 and for several years before its incorporation existed as a construction company. Since then, the company has expanded to providing both residential and commercial properties. With years of relatively successful operation in the luxury niche, LetiVille provides customers with the best international standards in Ghana. Their mission pledges to provide Ghanaians with the best homes possible with excellent quality and design that stays relevant to the taste and lifestyle of customers. LetiVille properties focus on developing luxury projects in prime areas of Accra like Cantonments, Otanor, and Adjiringanor, East Legon Hills as well as outskirt areas such as Ayi Mensah, Aburi, and Weija.

LittyMart Company Limited was initially a sole proprietorship in 1982 founded by Leticia Kwakye Akeampong, before converting it into the parent holding Limited Liability Company in 1992. The goods trading arm of the company, which holds the same name as the parent company, will be the focus of this study. It will be referred to as LittyMart. The company has four main distribution outlets all located in Okaishie, Makola, in the Greater Accra region of Ghana. Its primary activities are the wholesale of

goods such as underwear and napkins to wholesalers and retailers. The company also wholesales to businesses in Kumasi, Togo, and Nigeria.

The mission of LittyMart is to be the number one wholesaler of quality goods, to set market trends in the underwear industry by collaborating with Chinese (who are their only suppliers) companies that offer the best quality and design at the best price.

LittyMart employs a total of 25 employees, which includes a general manager, shop managers, an inventory manager and a bookkeeper that constitute upper-level employees. Also, the salespersons and a driver make up the lower level employees. Loyal customers and effective management drive the company's success. The firm imports their products from trusted Chinese companies they have been in partnership with for over fifteen years. This extended partnership serves as an advantage to the company as there are mutual understanding and flexibility in payment transactions.

1.3 SWOT ANALYSIS

Good performance within an organization is as a result of the active interaction of business management with its internal and external environment (Houben, 1999). A SWOT analysis is an analytic technique that an organization can conduct for each of its products and markets when deciding on the best way to achieve growth. The process involves the identification of the strengths, weakness, opportunities, and threats present in the market it operates in (Free Management Ebooks, 2013). The SWOT analysis of LittyMart conducted explores the well being of the business and the market it operates in.

Figure 1: SWOT Analysis of LittyMart

Strengths

According to Cadle *et al.* (2010), strengths are the positive internal capabilities of an organization. The strengths of LittyMart include good qualities such as:

- *Quality products*: LittyMart offers high-quality products on the market. Compared to the products offered by its competitors, LittyMart deals in high-end and durable products. For example, one of the leading Brassier products is Anita and LittyGold. These products were introduced to the market over 20 years ago, and it's still in demand today. Although the firm faces an ongoing threat of imitation of these two products, it has not affected the demand for it.

And retailers are aware of the difference thus, making LittyMart the to go place.

- *Diverse product list*: the company has over 100 different underwear designs. Their product list is extensive, and they are well known for that.
- *Goodwill:* LittyMart has established a reputation in the trading industry as one of the leading wholesalers of underwear and the other goods that they deal in such as napkins.
- *Lengthy Years in operation:* LittyMart has been operating successfully for over 30 years and as such consumers and retailers trust the brand and its products and that reflects in their daily revenue.
- *A Good market strategy:* the company adopts a simple marketing strategy by giving special prices to some top customers and sometimes runs promotions on products. For example, retailers from Kumasi receive special discounted prices on some products such as Anita, boys and girls. The firm also introduces new brassier designs annually as a result of the competitive nature of the trade. Also, LittyMart offers end of year gift giving to all clients to show appreciation for their loyalty.
- *Good relationship with partners***:** imitation of goods is a problem in the trade industry and as such a good business relation between manufacturers and wholesalers is paramount. LittyMart has built good relationships with its partners primarily due to the transparency it exhibits.

Weaknesses

- *Lack of stock clearance strategies:* the firm lacks a proper framework for clearing goods that have been in storage for a long time.
- *The occurrence of overstocking and stock-outs:* due to the firm's ad hoc reorder system in place; overstocking occurs on products that appear to be fast moving. Additionally, managers assume continual sales on these products and as a result reorder more. On the other hand, the firm experiences stock-outs on some of the firms *Fast Moving Goods* (FMG) such as Anita, LittyGold, Boys and Girls annually.

Opportunities

- Expansion: In the future, the company plans on expanding by opening other stores in other markets aside Makola, to keep up with competition and gain more market share.
- *Diversification:* LittyMart plans to diversify into the textile industry, which is seen to be a very viable and profitable business in Ghana.

Threats

- *Competition:* there are many enterprises that deal with same or similar merchandise. This situation poses serious competition to LittyMart as it reduces its market and customer share.
- *Unfavorable government policies:* revised importation policies by the government have increased the cost of imports. Additionally, the first Saturday of every month cleaning policy affects possible sales the firm

would have made, because it is mandatory by law for all shops in Mokola to close up until 1 pm for the exercise.

- *Consumer Behavior:* fast-changing consumer behavior dramatically affects how the firm competes. Especially in the brassiere market, consumers are always looking for new designs, so the firm has to decide which designs to invest in.
- *Supplier manufacturing Terms:* suppliers have specific minimum quantity they require per product and this affects reordering decisions. Especially with new Brassier designs, LittyMart tries to play it safe by ordering an amount that they feel will not lead to future losses. The firm retails products such as *Hipsters* and *Geddle* as they are unable to purchase the minimum quantities required buy their Suppliers.

1.4 INDUSTRY ANALYSIS

LittyMart's trading activities fall under imports and exports in the informal sector. More than 85% of the firm's product list falls under the underwear market and the rest being kitchenware. Due to the demand and relatively low prices of our products, they fall under the *Fast Moving Consumer Goods (FMCG)*. Since data on FMCG is readily available, it will be the focus of this analysis.

Undoubtedly, the FMCG sector represents one of the largest industries in the world. The sector is characterized by firms that offer low priced goods that are in constant high demand (KPMG, 2016). In Africa, FMCG retailers operate in a low margin environment; the presence of large markets is important to the success of firms that fall

within (KPMG, 2016). According to PWC (2015), the continent has undergone some changes that have made a hub for consumer-focused investments.

"Since Ghana started with offshore oil production in 2010, it has been one of sub-Saharan Africa's fastest-growing economies with GDP increases of 14%, 8% and 7.3% in 2011, 2012 and 2013 respectively (PWC, 2016)." Traditionally, the country is positioned as an attractive business environment, but in recent times, businesses have been affected by some challenges; power cuts, a weak currency and high lending rates (PWC, 2016). To help curtail these challenges, the International Monetary Fund approved a $918m three-year credit facility to restore debt and macroeconomic stability (PWC, 2016).

Ghana's capital, Accra is the most pulpous city with more than 4 million people (PWC, 2016). Ghana's organized informal retail and wholesale centers are Mokola and Kaneshie market among others. The informal trade accounts for about 90% of the retail and wholesale market (PWC, 2016). According to Haug (2014), most owners of enterprises in the informal sector do enjoy high returns on their investment because of the informal setting they operate in. The Makola Market was established in 1924 in the heart of Accra (VeiwGhana, 2018). The market was the main wholesale and retail marketplace in Accra as well as the core of trade in the country. The market is dominated by women traders dealing in fresh produce, manufactured and imported goods ranging from clothing, kitchenware, medicines, jewelry and food (VeiwGhana, 2018). There are varied elements in the macroeconomic setting of a particular industry that affect the decision making of any business. These elements stem from tax laws, trade barriers, government and policy changes.

1.5 Chapter Conclusion

This chapter examined the business set up and environment of LittyMart and analyzed the trading industry in Ghana. The chapter also profiled the firm's strengths and weaknesses, as well as the available opportunities and visible threats. This information enables the company when strategically position itself in the market to increase its competitiveness.

Chapter 2: NEEDS ASSESSMENT

2.1 CHAPTER OVERVIEW

This chapter assesses the needs of LittyMart and outlines methods used for the assessments. The findings from the needs assessment were also analyzed. The findings revealed some loopholes in the management of the company that is inimical to its progress.

2.2 BUSINESS ANALYSIS PROCESS ADOPTED

A need assessment was conducted to ascertain the problems of the company and to analyze the overall performance. "A needs assessment is a systematic way of determining the current state of an organization before developing solutions to improve existing current conditions" (Musser *et al.*, 2012). It is vital in determining the strengths and weakness of an organization to assess and improve activities or operations. A needs assessment was conducted at LittyMart to outline loopholes in the daily operations of the business that affected productivity, sales, attitudes and overall improvement of the company. Observations and Interviews conducted make up the data collection tools. These different modes of collecting data have proven to supplement each other thereby creating a formidable methodology.

2.3 METHODS ADOPTED FOR THE NEEDS ASSESSMENT AND SWOT ANALYSIS

Interviews

Conducting an interview is a method of obtaining qualitative data in research. A researcher may choose to conduct an interview either face to face or over the telephone.

Key informant interviews involve interviewing a selected number of employees that the researcher believes are likely to provide relevant information or insights on a particular subject (Kumar, 1989).

For this research, face-to-face interviews with key staff members and customers as well as competitors were conducted using interview guides. This approach allows the interviewer observe non-verbal communication that may be important to the project. The interviews are undertaken in the shop dependent on where each station of the interviewee, which allowed the researcher to observe activities of the firm as well. Firstly interviewed are The CEO, general manager and inventory manager. These interviews are semi-structured, and the aim is to uncover which areas within the firm needed to be improved. The General Manager was the first person to be interviewed. The inventory manager whose role is to deposit daily sales, issue and receive stock, and see to the general management of the warehouse is interviewed. Questions asked were centered on the current inventory management approach thus informing research about the effectiveness of their inventory management. Lastly, the CEO was interviewed and questions asked were related to the supply chain procedures. This is because according to the General manager, it is the duty of the CEO to design, order and reorder products stocked in the shops. Findings from the needs assessment created an understanding of the microenvironment and also informed the result of the SWOT analysis.

Mokola is Ghana's epicenter of trade and to understand the macro environment, the researcher interviewed some customers and competitors. The interviews took place over a week and involved thirty customers. A convenience sampling method was used– customers were interviewed as and when they came to purchase products. Two sales

persons of the firm's direct competitors were interviewed and about six indirect competitors that deal in other products such as UK and US imported consumables and toiletries, clothing stores and textiles.

Observations

Observational research requires the researcher to spend a considerable amount of time to study the area under consideration in its entire context. The researcher may choose to do this at a distance or immerse oneself to be a part of the understudy group, a technique respectively known as Etic and Emic types of observational studies (Lacono *et al. 2016)*. Undoubtedly, observational research is one of the most effective techniques used in qualitative research because it gives the researcher accurate report on real-life situations. The method used focuses on observed behavior relating to how workers relate and communicate with each other, with management, and conflict resolutions between workers and how the daily operation of the business is run. Additionally, it also helps to understand in practical terms how the company manages inventory.

2.4 Results of Needs Assessment

Current Market Situation of LittyMart

Based on the information obtained from conducting the needs assessment, it was an overall perception that the company being in the business for over thirty years has a competitive advantage over its competitors regarding the size of its customer base and the goodwill garnered by the firm over the years. There has been a recent influx of underwear shops in the market. Since underwear is the primary product of LittyMart, this is affecting sales and revenue. However, the company appears to have captured a considerable chunk of the underwear market. They have created a niche by creating new designs that appeal

to their customers ahead of their competitors and maintaining good relationships with customers.

Unknown maximum and minimum Inventory Levels

The needs assessment, however, identified some constraints inimical to the growth and development of LittyMart. The needs assessment revealed that LittyMart holds an alarming amount of excess inventory they no longer stock in their stores. The reason, I believe is that the firm may be purchasing too much or hopeful in their sales forecasting. Currently, the CEO is the only major decision maker in the firm. She decides which designs to stock and in what quantities, communicates with suppliers' details and finally, designs and introduces new products to the market.

LittyMart offers different products ranging from kitchen napkins and undergarments for both sexes. Although the firm has been stocking the same brand of products for many years, they do however introduce new products periodically. According to the general manager, due to an influx of new underwear companies, sales have diminished in all areas except products like *Anita* and *Litty Gold.* Back to school season (from August to September) and holiday season (December to January) determine the goods import schedule. The CEO relies on inventory levels and past sales records to determine how much of each product to stock.

It is worth noting that, the shop manager issues the request of goods to a shop, nonetheless, the CEO may request for goods to various shops whether they have stock of it or not. It is her impression that once that product is stocked in the shop, sales will improve. Consequently, over time, shops get congested with products, which are stored in the back rooms of the shop and end up obsolete. Subsequently, Managers lose sight of

the products they have in stores. According to the general manager, shop managers become overwhelmed with the different number of products and are often seldom in the know about some goods they have in stores. For instance, she recalls a time during stock Taking when a shop manager noticed that he unknowingly had stock of some products that he thought he had run out of. As a result possible sales of those products have been lost.

2.5 PROBLEM STATEMENT

LittyMart operates within the imported goods and trading of FMCG in Ghana's economy. With years of successful operations, the firm has built a reputation as one of the leading underwear and napkins wholesaler in Okaishie Mokola. Although the firm is going through recent restructuring, they now face a new threat of stock outs and overstocking of products in their warehouses and shops. As such, causing losses to the firm as the CEO lacks adequate information about the product shelf life, optimal maximum and minimum levels and as such reorders on a whim.

LittyMart hopes to explore how optimized inventory levels are to be determined, by prioritizing inventory and establishing how that translates to an optimized inventory level with the use of mathematical tools.

2.6 RELEVANCE OF PROJECT

The principle purpose of the project is to present a working solution for reliable tracking inventory of LittyMart, where a large number of product variations complicates the implementation of this kind of research. The firm faces an ongoing challenge and must find a balance between buyer service levels and make sure the firm holds the right amount of inventory without excess. Because of the viability of demand and supply,

firms tend to carry more safety stock to cater to these changes to not miss out on possible sales. Granted that having a safety stock has its advantages, firms have to be careful deciding which products and in what quantities they should be in to reduce unnecessary inventory cost. Finally, because of the business nature of LittyMart and firms alike, a more simplistic and efficient approach will best suit the aim of the research.

2.7 Chapter Conclusion

This chapter looked at trading in Ghana and the role of inventory management in trade. It outlined the aims and objectives of the study and identified some constraints to the running of LittyMart. Interviews and observations were used as a tool in carrying out the needs assessment to identify important pressing issues that need to be addressed to foster better management and improve the earnings of the firm. These findings also informed the results of the SWOT analysis carried out. These needs identified by assessing LittyMart's strengths and weaknesses. Paramount among these issues is a lack of proper inventory tracking in the firm and a planned strategy for determining product-reordering decisions.

CHAPTER 3: LITERATURE REVIEW

3.1 Chapter Overview

This section takes a look at existing inventory optimization techniques in industry and the methods by which these systems are streamlined to ensure efficiency in the running of the day-to-day business activities of a firm.

3.2 INVENTORY MANAGEMENT

Lysons & Gillingham (2003) define inventory as the value or quantity of raw materials, components, assemblies, work-in-progress (WIP), consumables and finished stock that a firm or business establishment keeps or stores for use as the need arises. It is, therefore, the number of or value of the stock of goods a company holds and this could comprise either raw, intermediate and finished goods that can serve as supplies that are required for the subsequent creation of a firm's final product or services (Coyle *et al.,* 2003). Inventory management is the running of the considerable portion of current assets for most firms. It refers to all activities that are involved in tracking and managing inventory levels of raw materials, semi-finished materials and finished goods to ensure adequate and regular supply of goods and reduction in inventory costs (Kotler, 2000). Yang & van Heck (2009) describe inventory management as specifying the size and placement of stocked goods within an organization's supply chain to protect the production or sale systems from running out of materials or goods.

Primarily, there are two central decisions for managing inventory that is, how much to reorder and when and in the past, simple calculations were used to determine solutions to managing inventory (Mahir Dugie, 2011). In modern times, firms have

adopted more complex and customized strategies to reduce the cost associated with holding inventory. The size of the firm is a crucial determinant of what management technique to utilize. It is worth noting that the criterion used to determine whether a firm is large, medium or small depends on how many people they employ.

According to the United Nations Development Organization (UNIDO), the classifications for developed and developing countries are as follows: Large firms- firms with 500 or more workers; medium- firms with 100-99 and Small- firms with 99 or fewer workers. The classification for developing countries is: large- firms with 100 or more workers; medium- firms with 20-99 workers; small firms with 5-19 workers and micro- firms with less than five workers. Welsh and White (1981) argue that the size of small establishments generates a unique condition referred to as resource poverty that singularizes them from big businesses and thus requires a very different management approaches. Apart from the size of the firm, the type of supply chain practices also informs decisions relating to forecasting, reorder quantities, lead times and so on. In the book "*Demand-Driven Inventory Optimization Replenishment*" by Robert E. Davis sites an exciting thought on inventory optimization. In the book, the author almost dispels the supply driven mentality of holding inventory; pushing the product to the market instead of a demand-based supply. He points out that a sale does not necessarily represent a demand for a particular product and firms will reach optimal efficiency when they practice the demand-driven technique.

3.3 PRIORITIZATION OF INVENTORY

There are many inventory management and prioritization techniques discussed in the literature. These include ABC, XZY, and VED among others. A majority of them

deal with some complicated mathematical models, which are beyond the reach of small firms (Lin, 1980). In light of this, I focused on literature specific to SME firms.

XYZ Analysis

The XYZ also follows the Pareto Principle of the ABC analysis that group inventory into X, Y, Z classes based on demand variability (Dhoka & Choudary, 2013). In other words, the XYZ distinguishes between items according to their oscillations in consumption (Scholz-Reiter, Heger, & Meinecke, 2012). The analysis caters to customers' demands for finished goods (Hu, 2012). Where X is high demand, y is moderate demand and Z low demand (Hu, 2012). The items are ranked in a descending order according to their present-day stock value, which gives an immediate view of which items are expensive to hold and thus help in decision-making (Hu, 2012). On the other hand, the XYZ analysis displays certain disadvantages; it categorizes new products in class Z because the demand pattern is yet to be established as a result it is best to exclude new items (Dhoka & Choudary, 2013). In the case where new items contribution to inventory cost is significant, managers have to make volatility adjustments in their calculations (Dhoka & Choudary, 2013). Lastly, the analysis also overlooks seasonal items; therefore such items have to be excluded when using this method (Dhoka & Choudary, 2013).

ABC Analysis

Inventory Allocation systems help firms allocate time and resources in inventory management and enable firms to deal with multiple product lines and the multitude of stock-keeping units (Bloomberg, LeMay, & Hanna, 2002). The ABC analysis prioritizes goods into three groups according to the relative influence or value of the items in that

group (Coyle *et al.,* 2008). It uses the Pareto Principle for determining which items should get priority by using the dollar value as the criterion for performing (Ravinder & Misra, 2014). Class A – this is made up of goods that represent a major part of the firm's spending and is considered by management as the most important stock. This categorization is based on what goods the firm regards to very important to the business. Class B – this is made up of goods of 'intermediate' or relatively less importance to the firm. Class C – this is made up of goods that receive the very least consideration by the firm (Cheverton and Velde, 2010). If managed correctly, this group of stock can be salvaged and earned considerably. Traditionally, the analysis has been based on the dollar volume (Ravinder & Misra, 2014) however; criteria other than annual dollar volume can determine the classification of an item (Heizer & Render, 2014). For example, other criteria such as scarcity, reparability, durability and item criticality are essential (Ravinder & Misra, 2014).

3.4 INVENTORY MANAGEMENT TECHNIQUES

Economic Order Quantity (EOQ) Approach

The EOQ is one of the most classical production scheduling models. According to Kumar (2016), the EOQ model can be to minimize the cost associated with ordering and holding inventory. Kumar (2016) continues to explain that it can be used by small business owners who need to make decisions about how much inventory to keep on hand, how many times to order each time, and how often to reorder to incur the lowest possible cost. The model assumes that:

a. The demand rate for the year us known and evenly spread throughout the year
b. There is no time gap between placing an order and receiving its supply

c. Ordering cost very directly with the number of orders
d. Carrying cost very directly with the average inventory
e. There is no quantity discount (Kumar D. R., 2016)

This classical approach, however, has been over the time reviewed and customized by researchers to best fit the practical world of business today. For example, the classical model assumes a constant demand rate, however, in practical situations, there is inventory loss due to deterioration of units (Okwabi, 2014).

In an article by González and Gonzalez (2010) titled " Analysis of an Economic Order Quantity and Reorder point Inventory Control Model for company XYZ," explores various inventory optimization strategies suitable for small businesses. In which two forecasting methods were used to determine the firms demand to reduce cost by 61% on the top 13 products offered. Additionally, the researchers applied the EOQ model to deal with the occurrence of stock outs. The products are sorted into two categories namely, seasonal index and moving averages. As the name suggests, the seasonal index included products that have a seasonal demand and the moving averages included products that had a constant demand over time.

Enterprise Resource Planning (ERP)

Thakkar, Kanda, & Deshmukh (2008) argues that small and medium businesses are unprotected to the consequences of the developments in information, communication technologies and computing, which may provide a competitive advantage as well as threats. Information is used to make business decisions more efficient, therefore; the effectiveness of an inventory management system depends on the quality and accuracy of the information it uses (Dumas, 2008). Jofreh, Jahaniam, Bahrami, & Jabbari (2013)

describe Enterprise Resource Planning (ERP) as a technique involving the use of computer machinery for directing numerous activities like accounting, inventory control and human resource of any company. It is an entirely automated and integrated e-enabled system that encompasses all basic functions of an organization (Jofreh, Jahaniam, Bahrami, & Jabbari, 2013). Serveral reseachers have discussed the adoption of an ERP system by small, medium and large business. It is safe to say that the success of implementing ERP systems depends on industries, businesses and countries (Juell-Skielse, 2006) thus, may be a lifesaver to all inventory problems.

It seems like investing in an ERP is the most logical inventory decision for firms; Nonetheless, it is not always the case. Some literature are critical to small and medium businesses adopting ERP systems because it is time-consuming and require skill, training and expertise. For this reason, not all firms are quick to incorporate ERPs into there Inventory management efforts. For example, when Foxmeyer Drug, a $5 billion pharmaceutical company filed for bankruptcy, they attributed its failure to a failed ERP system, which created excess shipments resulting from incorrect orders (Muscatello, Small, & Chen, 2003).

"Dubelaar, Chow and Larson in their article "Relationships between inventory, sales and service in a retail chain store operation" also stated that for a retail shop to succeed, it needs an effective inventory management (2001). The best practices in managing inventory in retail require a balance between "inventory and service levels, recognition of the importance of merchandise availability, and accurate store sales/inventory data." This balance was proven positive in the survey conducted by the authors on 101 chain store units. Inventory in retail shops, in most cases, are based on

the principles of the Economic Order Quantity (EOQ) model." (Amoah, 2017)

3.5 Chapter Conclusion

Inventory optimization practices have been discussed extensively in the literature. They include the ABC, XYZ and EOQ analysis among others. Also, the literature review reinforces and adjusts the solution proposed in this project.

CHAPTER 4: SOLUTION AND IMPLEMENTATION PLAN

4.1 Chapter Overview

This chapter is a presentation of my data collection process. Considerations and comparisons of the various inventory management models: ABC analysis and EOQ model, derived from literature. LittyMart as aforementioned in the introduction of this paper is facing a current need to reduce the cost of holding inventory. Additionally, the firm loses out on future sales when they experience stock-outs on some of their fast-moving goods. It was concluded that the ad hoc re-ordering system they currently have in place affects the firms bottom-line and thus, needs to be improved.

4.2 DATA COLLECTION FOR TOOL

The findings from the needs assessment suggest that LittyMart has an ongoing problem of holding large amounts of excess inventory. Secondly, the firm experiences stock-outs on other products as well. In addition to that, LittyMart does not have a structured clearance strategy dealing with products that have surpassed its life cycle. The researcher's initial possible solution was to determine the economic order quantity for the firm's products. The EOQ model is a control measure that manages inventory levels, ordering and re-ordering times and lead times. Literature was then reviewed extensively with the hopes of developing a tool. Two assumptions that guided the development of the research tool is as follows:

- If the firm is experiencing stock-outs, it may be because they are not reordering at the right time
- If the firm is holding excess inventory, it may be because they are over-optimistic in their forecast

The researcher requested three years of historical sales and inventory cost (shipping cost and warehouse cost) data. Additionally, the CEO was then reinterviewed to obtain data associated with all inventory costs. The firm has available a year of accurate sales records and that was the data used for the solution. The solution is to create a tool for tracking and controlling inventory. Based on the assumption of the research, it is best to find solutions to the root of the problem than dealing with the effects of it — the occurrence of stock outs and product obsolesce.

4.3 FEATURES OF THE TOOL

The features of the tool are the various components that come together to make the tool work efficiently. The Inventory Control List Tool for LittyMart contains the following components:

- Manual input of updating products list, sales, and goods movement information
- Visual Reorder, low inventory level alerts
- Sales forecasting add-on
- Easy to use and interpret information

4.4 REASONS FOR CHOOSING TOOL

LittyMart has a simple business structure. Therefore, the tool was chosen with that in mind. It will run in Microsoft Excel and stored in the firm's computer. It is programmed to respond to information automatically to give accurate updates always. In addition to that, the tool will be stored on Google drive— a free application that allows users to store, share and synchronize documents. Since login is traceable, it will help reduce mistakes and improve transparency. The tool can be accessed anywhere and

updated from any location. Besides that, the tool provides real-time updates irrespective of location and can be conditioned to send alerts promptly.

4.5 DESCRIPTION OF TOOL

The advised tool necessitates a computer or any smart device such as smartphones, notebooks, and computer tablets to access it. Internet connectivity is needed in the event of updating to the online database. The excel document sanctions for changes to be made when necessary. Additionally, authorized persons need to feed inaccurate data to correspond to the actual inventory levels. Updates can be made in the absence of internet connection, preserved and can later be uploaded once internet connectivity is restored. The conditioned cells within the spreadsheets will highlight products that need to be reordered. Suppose the firm discontinues holding stock of a particular product, the tool provides an option for update. On the other hand, if the firm should decide to restock that particular product in the future, all preceding information will still be available.

4.5 USE OF TOOL

The inventory manager and the general manager should use the tool. The primary role of the inventory manager is to receive goods imports, store and manage and authorize the disbursement of goods to the various outlets the firm has. Also, it is the responsibility of the general manager to receive goods and make sure that the goods have been dispersed in the right amounts. Thus, limiting usage to them will ensure that accurate information is stored. Other staff members can log on to obtain information but should not be able to make changes to the tool. General updates will only be possible with the aid of an Internet connection to the updated device.

The tool must be updated daily or weekly so that alerts are received promptly. If the firm discontinues sale on a product, this information should also be updated so that the salespersons and other employees are made aware.

4.6 STAGES OF TOOL

The researcher started the implementation of an inventory control tool by reviewing the literature and selecting the right models to be involved in the process. However, these models where somewhat customized to fit the situation of the firm.

ABC Prioritization Tool

ABC INVENTORY CLASSIFICATION						
Product Name	**Cost/Unit (GHC)**	**Annual Demand (dz)**	**Annual Turnover (GHC)**	**Contribution to Turnover**	**Cummulative % Annual Turnover**	**Classification**
Napkins	5.416667	68000	368333.3	24.74%	24.74%	A
Foam braziers	6.25	48000	300000	20.15%	44.88%	A
Real Comfort	5.5	40000	220000	14.77%	59.66%	A
Boys	5	25000	125000	8.39%	68.05%	A
Litty Gold	5.5	16000	88000	5.91%	73.96%	B
Anita	5.1	16000	81600	5.48%	79.44%	B
Girls	5.416667	15000	81250	5.46%	84.90%	B
Chase Deer	6	10000	60000	4.03%	88.93%	B
Big Boss	2.25	10000	22500	1.51%	90.44%	C
Lux T-Shirt	5.583333	4000	22333.33	1.50%	91.94%	C
Ladies Vest	6.666667	3000	20000	1.34%	93.28%	C
STG	2	10000	20000	1.34%	94.63%	C
VIP	2	10000	20000	1.34%	95.97%	C
Andy	2.25	8000	18000	1.21%	97.18%	C
Terry Boy	2	8000	16000	1.07%	98.25%	C
Sea Bale	3.166667	4000	12666.67	0.85%	99.10%	C
Ladies Pant	3	3000	9000	0.60%	99.71%	C
Tube	3.166667	500	1583.333	0.11%	99.81%	C
1117 Hips	20	60	1200	0.08%	99.90%	C
Geddle	5.166667	200	1033.333	0.07%	99.96%	C
Banana Boxers	5	100	500	0.03%	100.00%	C
Belly Band	2.5	10	25	0.00%	100.00%	C
		Total	1489025	100.00%		

The table above list all the products sold by LittyMart. The ABC analysis was used to categorize which items should get top priority in the managing of the firm's inventory. Variables for ranking such as product sales, product usage were looked at for this classification. Ranked items were arranged in descending order of significance according to this criterion to determine actual and cumulative total revenue. The total sales per product are documented properly, thus this was used to calculate the portion of inventory that belongs to each class.

The goods in LittyMart's warehouse where categorized into the following classes:

(a) Class A items: this is made up of goods the form a major part of the firms spending and considered the most important stock the firm holds.

(b) Class B items: this is made up of goods of intermediate importance to the firm

(c) Class C items: are made of goods that receive the very lest consideration by the firm

EOQ Tool

Economic Order Quantity								
Product Name	Unit Cost (GHC)	Annual Demand (Dz)	Ordering Cost (GHC)	Unit Holding Cost (GHC)	Lead Time (Days)	Working Days/Year	Optimal order quantity (dz)	Reorder Point
Napkins	5.42	68000	95767	6.48	45	315	44845	9714
Foam braziers	6.25	48000	78000	4.57	45	315	40472	6857
Real Comfort	5.50	40000	57200	3.81	45	315	34658	5714
Boys	5.00	25000	32500	2.38	45	315	26125	3571
Litty Gold	5.50	16000	22880	1.52	45	315	21920	2286
Anita	5.10	16000	21216	1.52	45	315	21108	2286
Girls	5.42	15000	21125	1.43	45	315	21062	2143
Chase Deer	6.00	10000	15600	0.95	45	315	18100	1429
Big Boss	2.25	10000	5850	0.95	45	315	11084	1429
Lux T-Shirt	5.58	4000	5807	0.38	45	315	11043	571
Ladies Vest	6.67	3000	5200	0.29	45	315	10450	429
STG	2.00	10000	5200	0.95	45	315	10450	1429
VIP	2.00	10000	5200	0.95	45	315	10450	1429
Andy	2.25	8000	4680	0.76	45	315	9914	1143
Terry Boy	2.00	8000	4160	0.76	45	315	9347	1143
Sea Bale	3.17	4000	3293	0.38	45	315	8316	571
Ladies Pant	3.00	3000	2340	0.29	45	315	7010	429
Tube	3.17	500	412	0.05	45	315	2940	71
1117 Hips	20.00	60	312	0.01	45	315	2560	9
Geddle	5.17	200	269	0.02	45	315	2375	29
Banana Boxers	5.00	100	130	0.01	45	315	1652	14
Belly Band	2.50	10	7	0.00	45	315	369	1

The EOQ tool above shows the various inputs used in calculating optimal order of products stocked by Littymart. The optimal order quantity shows the volume per product that the firm needs to hold to reduce inventory cost and boost its capacity. The reorder point is the level that prompts managers to reorder particular products.

Inventory Optimization Tool

Inventory Schedule List

LITTYMART ENTERPRISE

Product ID	Description	Unit Price (GHC)	Quantity in Stock (dz)	Inventory Value on Hand	Reorder Level (Dz)	Reorder Time (days)	Reorder Quantity (Dz)	Total Inventory Value (GHC)	Discontinued?
Napkins		5.42	37576	203661.92	9714	45	44845	446721.82	
Foam Braziers	Brassier	6.25	19600	122,500.00	6857	45	40472	375,450.00	
Real Comfort	Vest	5.50	10500	57,750.00	5714	45	34658	248,369.00	
Boys	Vest & shorts	5.00	15500	77500	3537	45	26125	208125	
Litty Gold	Brassier	5.50	0	0	2286	45	21920	120560	
Anita	Brassier	5.10	0	0	2286	45	21108	107650.8	
Girls	Vest & shorts	5.42	9000	48780	2143	45	21062	162936.04	
~~Chase Deer~~	~~Vest~~	~~6.00~~	~~8911~~	~~53466~~	~~1429~~	~~45~~	~~18100~~	~~162066~~	~~YES~~
Big Boss	Vest	2.25	9155	20598.75	1429	45	11084	45537.75	
Lux T-Shirt	Vest	5.58	2030	11327.4	571	45	11043	72947.34	
Ladies Vest	Vest	6.67	2200	14674	429	45	10450	84375.5	
STG	Vest	2.00	7630	15260	1429	45	10450	36160	
VIP	Vest	2.00	8800	17600	1429	45	10450	38500	
Andy	Vest	2.25	5000	11250	1143	45	9914	33556.5	
Terry Boy	Vest	2.00	6600	13200	1143	45	9347	31894	
Sea Bale	Vest	3.17	3440	10904.8	571	45	8316	37266.52	
Ladies Pant	Panty	3.00	2050	6150	429	45	7010	27180	
Tube	Tube	3.17	400	1268	71	45	2940	10587.8	
1117 Hips	Undershorts	20.00	50	1000	9	45	2560	52200	
Geddle	Undershorts	5.17	188	971.96	29	45	2375	13250.71	
Banana Boxers	Undershorts	5.00	100	500	14	45	1652	8760	
Belly Band		2.50	6	15	1	45	369	937.5	
	Total Inventory Value (GHC)								**2325032.28**

The above figure shows the various product the firm wholesales. The firm has one supplier that deliver all the products the firm stocks. The tool incorporates the ABC analysis as products are color coated according to their classes. The struck out red highlighted row occurs once the firm decides to discontinue selling a particular product. It is done by typing *YES* at the *Discontinued?* column. All information about that particular product will still be available. Currently, the firm has no stock of Anita and LittyGold which gives a visual alert by highlighting their reorder quantities.

4.7 Chapter Conclusion

Inventory control practice is very critical to a firm's bottom line. LittyMart is a medium enterprise that needs a simple, practical and efficient way of managing inventory. A tool was then created using successful techniques existing in the literature.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Recommendations

To make the tool work, and also based on the literature, the firm should consider training workers on how the tool works. Additionally, the tool should be available to all shop managers to prevent stockouts and promote adequate product communication within the firm. All inputs need to be cross-checked by another person to reduce errors. As it is difficult to calculate for Optimal orders on new products, LittyMart should consider using forecasting methods as a guide in determining demand. In line with the findings from the needs assessment and also due to the large quantities of inventory in LittyMart, managers can use the tool to aid stock taking. The tool can be used by comparing actual quantities obtained by physically counting inventory to the amounts provided by the tool.

Undoubtedly, the firm still holds some amount of products that have completed its life cycle, thus, discounts can be offered to products that are in low demand. Additionally, the firm can engage in clearance sales or donate the product to charity.

Conclusion

This project has explored and delved into inventory optimization strategies for LittyMart Enterprise. The firm is seen to hold some amounts of goods that have reached obsolescence and also experience stockouts because of the ad hoc systems they currently practice. Literature was then reviewed to suggest and layout a solution for such problems. ABC analysis was used to classify the firm's inventory. The EOQ model was then used to determine minimum and maximum orders. These two models

were then merged to create an inventory Schedule list which helps control and manage inventory, thereby reducing the firms cost.

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APPENDIX

Figure 1: SWOT Analysis of LittyMart

Figure 2: ABC PRIORITIZATION TOOL

ABC INVENTORY CLASSIFICATION						
Product Name	**Cost/Unit (GHC)**	**Annual Demand (dz)**	**Annual Turnover (GHC)**	**Contribution to Turnover**	**Cummulative % Annual Turnover**	**Classification**
Napkins	5.416667	68000	368333.3	24.74%	24.74%	A
Foam braziers	6.25	48000	300000	20.15%	44.88%	A
Real Comfort	5.5	40000	220000	14.77%	59.66%	A
Boys	5	25000	125000	8.39%	68.05%	A
Litty Gold	5.5	16000	88000	5.91%	73.96%	B
Anita	5.1	16000	81600	5.48%	79.44%	B
Girls	5.416667	15000	81250	5.46%	84.90%	B
Chase Deer	6	10000	60000	4.03%	88.93%	B
Big Boss	2.25	10000	22500	1.51%	90.44%	C
Lux T-Shirt	5.583333	4000	22333.33	1.50%	91.94%	C
Ladies Vest	6.666667	3000	20000	1.34%	93.28%	C
STG	2	10000	20000	1.34%	94.63%	C
VIP	2	10000	20000	1.34%	95.97%	C
Andy	2.25	8000	18000	1.21%	97.18%	C
Terry Boy	2	8000	16000	1.07%	98.25%	C
Sea Bale	3.166667	4000	12666.67	0.85%	99.10%	C
Ladies Pant	3	3000	9000	0.60%	99.71%	C
Tube	3.166667	500	1583.333	0.11%	99.81%	C
1117 Hips	20	60	1200	0.08%	99.90%	C
Geddle	5.166667	200	1033.333	0.07%	99.96%	C
Banana Boxers	5	100	500	0.03%	100.00%	C
Belly Band	2.5	10	25	0.00%	100.00%	C
		Total	1489025	100.00%		

Figure 3: EOQ Tool

Economic Order Quantity								
Product Name	Unit Cost (GHC)	Annual Demand (Dz)	Ordering Cost (GHC)	Unit Holding Cost (GHC)	Lead Time (Days)	Working Days/Year	Optimal order quantity (dz)	Reorder Point
Napkins	5.42	68000	95767	6.48	45	315	44845	9714
Foam braziers	6.25	48000	78000	4.57	45	315	40472	6857
Real Comfort	5.50	40000	57200	3.81	45	315	34658	5714
Boys	5.00	25000	32500	2.38	45	315	26125	3571
Litty Gold	5.50	16000	22880	1.52	45	315	21920	2286
Anita	5.10	16000	21216	1.52	45	315	21108	2286
Girls	5.42	15000	21125	1.43	45	315	21062	2143
Chase Deer	6.00	10000	15600	0.95	45	315	18100	1429
Big Boss	2.25	10000	5850	0.95	45	315	11084	1429
Lux T-Shirt	5.58	4000	5807	0.38	45	315	11043	571
Ladies Vest	6.67	3000	5200	0.29	45	315	10450	429
STG	2.00	10000	5200	0.95	45	315	10450	1429
VIP	2.00	10000	5200	0.95	45	315	10450	1429
Andy	2.25	8000	4680	0.76	45	315	9914	1143
Terry Boy	2.00	8000	4160	0.76	45	315	9347	1143
Sea Bale	3.17	4000	3293	0.38	45	315	8316	571
Ladies Pant	3.00	3000	2340	0.29	45	315	7010	429
Tube	3.17	500	412	0.05	45	315	2940	71
1117 Hips	20.00	60	312	0.01	45	315	2560	9
Geddle	5.17	200	269	0.02	45	315	2375	29
Banana Boxers	5.00	100	130	0.01	45	315	1652	14
Belly Band	2.50	10	7	0.00	45	315	369	1

Figure 4: Inventory Optimization Tool

Inventory Schedule List

LITTYMART ENTERPRISE

Product ID	Description	Unit Price (GHC)	Quantity in Stock (dz)	Inventory Value on Hand	Reorder Level (Dz)	Reorder Time (days)	Reorder Quantity (Dz)	Total Inventory Value (GHC)	Discontinued?
Napkins		5.42	37576	203661.92	9714	45	44845	446721.82	
Foam Braziers	Brassier	6.25	19600	122,500.00	6857	45	40472	375,450.00	
Real Comfort	Vest	5.50	10500	57,750.00	5714	45	34658	248,369.00	
Boys	Vest & shorts	5.00	15500	77500	3537	45	26125	208125	
Litty Gold	Brassier	5.50	0	0	2286	45	21920	120560	
Anita	Brassier	5.10	0	0	2286	45	21108	107650.8	
Girls	Vest & shorts	5.42	9000	48780	2143	45	21062	162936.04	
~~Chase Deer~~	~~Vest~~	~~6.00~~	~~8911~~	~~53466~~	~~1429~~	~~45~~	~~18100~~	~~162066~~	~~YES~~
Big Boss	Vest	2.25	9155	20598.75	1429	45	11084	45537.75	
Lux T-Shirt	Vest	5.58	2030	11327.4	571	45	11043	72947.34	
Ladies Vest	Vest	6.67	2200	14674	429	45	10450	84375.5	
STG	Vest	2.00	7630	15260	1429	45	10450	36160	
VIP	Vest	2.00	8800	17600	1429	45	10450	38500	
Andy	Vest	2.25	5000	11250	1143	45	9914	33556.5	
Terry Boy	Vest	2.00	6600	13200	1143	45	9347	31894	
Sea Bale	Vest	3.17	3440	10904.8	571	45	8316	37266.52	
Ladies Pant	Panty	3.00	2050	6150	429	45	7010	27180	
Tube	Tube	3.17	400	1268	71	45	2940	10587.8	
1117 Hips	Undershorts	20.00	50	1000	9	45	2560	52200	
Geddle	Undershorts	5.17	188	971.96	29	45	2375	13250.71	
Banana Boxers	Undershorts	5.00	100	500	14	45	1652	8760	
Belly Band		2.50	6	15	1	45	369	937.5	
	Total Inventory Value (GHC)								2325032.28

Table 1: Formulas Used

Reorder level	Annual demand/number of working days/year) *lead time in days
Safety stock	(Maximum daily usage * Maximum lead time in days) - (Average daily usage * Average lead time in days)
Optimal order quantity	(2*annual demand *ordering cost / holding cost)

Obtained from (Amoah, 2017)